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Correlation between the surface expression of CD133 and the phenotype of breast tumor cells

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Originally considered a marker of hematopoietic stem cells, CD133/prominin is a highly glycosylated trans-membrane protein expressed in various tissues, such as breast, in which it seems to regulate ductal branching but not regenerative capacity [1].

CD133 is also expressed in various solid tumors, including breast cancer, in which CD133-positivity seems to identify a restricted subgroup of tumor stem cells [2]. CD133 expression was heterogeneous in different breast carcinomas but, in triple-negative (ER-, PR-, HER2-) invasive ductal breast carcinoma, CD133 correlates with tumor size, metastasis and clinical stage [3].

In order to establish a correlation between the surface recognition of CD133 and the phenotype of tumor cells, the highly invasive breast-derived MDA-MB-231 cells (ER-, PR-, HER2-) were subjected to immunomagnetic separation of CD133+ and CD133- subpopulations, which were analyzed for malignant properties. In comparison to CD133- cells, the expression of CD133 characterizes cells with a larger adhesion area, lower proliferation rate and reduced migration speed. This phenotype correlates with altered expression of malignancy-associated proteins and with a peculiar pattern of PLC, in turn involved in proliferation and motility of breast tumor cells (4-6). This suggests that, in triple negative ductal breast tumor-derived cells, the expression of CD133 characterizes a small subset of cells with a less undifferentiated phenotype. The reduced expression of CD133 at membrane level may constitute a marker of the switch of tumor cells from a less malignant to a mature phenotype since it correlates with the de-regulation of proteins involved in cell proliferation, motility and invasion.

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References

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